REMARKS

Claims 1-33 were pending. Claims 9-12, 20-24 and 26-30 are rejected while claims 9-12, 20-24 and 26-30 are objected to as being dependent upon a rejected base claim. The applicant requests further consideration and re-examination in view of the remarks set forth below.

Rejections under 35 U.S.C. § 103:

Claims 1-8, 13-19 and 31 and 33 are rejected as being unpatentable over U.S. Patent No. 5,995,729 issued to Hirosawa et al. (hereinafter "Hirosawa") in view of U.S. Patent No. 6,366,644 issued to Sisk et al. (hereinafter "Sisk") and further in view of Grimsrud (hereinafter "Grimsrud"). Regarding independent claims 1, 13 and 25, the examiner stated that Hirosawa teaches a method for adaptation of a computer system, data storage system network or subsystem (at col. 2, line 60 to col. 3, line 23 and col. 6, lines 5-25), comprising developing a design for the system (at col. 3, lines 13 and col. 6, lines 5-25), implementing the design (at col. 3, lines 13-18 and col. 6, lines 5-25), analyzing operation of the design after said implementing (at col. 4, lines 1-16), and modifying the design based on results of said analyzing (at col. 4, lines 43-58). The examiner further stated that Hirosawa does not perform an automated loop, but that Sisk teaches performing an automated loop (at col. 4, lines 26-29). In addition, the examiner stated that Sisk does not teach forming a trace of storage system events or forming a workload characterization from the trace, but that Grimsrud teaches forming a trace of storage system events (at col. 1, lines 59-67 and col. 3, lines 38-44), forming a workload characterization from the trace (at col. 1, lines 59-67 and col. 3, lines 38-44) and applying the workload characterization to models of components of the data storage system (at Figure 1 and col. 2, lines 60 to col. 3, line 3), wherein said applying indicates utilization of a component of the data storage system (at Figure 2 and col. 3, lines 12-25). The examiner stated that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains because when installing a new computer system comprising a set of central processing units, a set of input/output units and a set of other pieces of equipment, or when it is necessary to add new equipment to or move some equipment from an existing computer system, the following jobs needs to be done: (1) Determine a layout within the installation site. ... (6) Determine configuration parameters required by the OS (operating system) and

generate a system based on the system parameters. Citing Hirosawa, at col. 1, lines 21-42.

The applicants respectfully traverse the rejection. The present invention is directed toward an automated system adaptation technique for computer systems, networks and subsystems generally and, more particularly, for data storage systems. The invention programmatically designs, configures and manages a system, such as a data storage system. This is accomplished by automatically performing a sequence of steps in an iterative loop, including analyzing the operation of the system under a workload, generating a new design based on the analysis and migrating the existing system to the new design. See Applicants' Summary of the Invention, at page 3, line 10, to page 4, line 4.

As is stated in the Manual of Patent Examining Procedure (MPEP):

> To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one or ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

MPEP at Section 706.02(j) (8th Edition, Rev. 2). Further, to rely upon a reference under 35 U.S.C. § 103, "the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." MPEP, Section 2141.01(a), quoting *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

The applicants respectfully submit that the references relied upon by the examiner have not been properly combined because there is not a suggestion or motivation to combine them and, even if they were properly combinable, the cited references to do not teach or suggest all of the limitations of claims 1, 13 or 25.

Hirosawa is directed toward a method and apparatus for aiding configuration management of a computer system. Hirosawa, Title. The method involves: determining proper locations for installing pieces of equipment composing a computer system through use of a drawing of an installation area displayed in a display screen and interactive operations between a user and the computer system; inspecting cables connecting the pieces of equipment after their installation locations have been determined for connection appropriateness, in response to a command issued by the

user; and generating configuration defining parameters to be used by the operating system of the computer system from characteristics of the pieces of equipment after the cable connection has passed inspection. Hirosawa, at col. 3, lines 23-38.

Hirosawa explains that its method is performed by the execution of several commands which invoke selected subprograms. Hirosawa, at col. 6, lines 48-57. The commands include a SET-DEV command which is issued to determine a layout of pieces of equipment, such as air conditioners and distribution boards, and to ensure that their positions do not overlap each other. Hirosawa, at col. 8, line 23 to col. 11, line 18. A CHK-AC command is issued to find out whether the amount of heat dissipated by the equipment exceeds the cooling capacity of the air conditioning for each floor. Hirosawa, at col. 11, lines 19-59. A CHK-PWR command is used for checking whether the amount of electrical power consumed by the installed equipment exceeds the capacities of the power supplies for each floor. Hirosawa, at col. 11, line 60 to col. 12, line 19. A SET-CBL command checks whether the connection of signal cables among laid out pieces of equipment is proper. Hirosawa, at col. 12, line 20 to col. 13, line 25. A SET-PCBL command is issued to carry out the same processing at the SET-CBL command for connection of power-supply cables. Hirosawa, at col. 13, lines 26-40. A GEN-TBL command is used for creating a manual describing cabling work instructions which comprise a channel cabling instruction table, a power-supply cabling instruction table and connection completed equipment layout table. Hirosawa, at col. 13, line 41 to col. 14, line 22. A GEN-CNF command is used for creating a logical configuration drawing showing logical relation and connection among pieces of equipment composing a computer system and configuration defining parameters required by an operating system running on the computer system. Hirosawa, at col. 14, line 23 to col. 16, line 23. An EDT command is prepared for partially correcting the configuration defining parameters. Hiroasawa, at col. 16, lines 24-51. A TRS command is used for transferring configuration defining parameters stored in a logical-characteristic file to a computer system. Hirosawa, at col. 16, lines 52-67.

Sisk is directed toward a loop integrity test device and method for digital subscriber line (xDSL) communication. Sisk, Title. It is well known that to provide telephone service to a subscriber's home or business, a telephone line connects the subscriber's telephone to a telephone service provider. This telephone line consists of a pair of metallic wires which are twisted together to reduce electromagnetic

interference and are, thus, referred to as a "twisted pair." The wires form a loop between the subscriber's premises and a termination point (e.g., a central office or remote terminal the telephone service provider) and are, thus, referred to as a "local loop." Sisk explains that an xDSL communication link is established across the local loop between customer premises equipment and a local loop termination point (e.g., a central office or remote terminal). Sisk, at col. 1, lines 22-25. In order to support xDSL communication, the twisted pair line on the local loop between the customer premises equipment and the loop termination point must meet certain physical characteristics. Sisk, at col. 1, lines 33-36. Otherwise, an xDSL communication link cannot be successfully established. Sisk, at col. 1, lines 36-37.

According to Sisk, integrity test devices for xDSL communication are located at the local loop termination point and the customer premises equipment and are coupled to the telephone line. Sisk, at col. 1, lines 54-57. The loop integrity test devices are respectively operable to transmit test signatures across the telephone line, to receive and evaluate test signatures from the telephone line, and to indicate whether the telephone line can support xDSL communication based on evaluation of the test signatures. Sisk, at col. 1, lines 57-62. The test signature is designed such that pertinent physical characteristics of the telephone line can be determined from analysis of changes to the test signature after it has traveled across the telephone line. Sisk, at col. 4, lines 4-8. Sisk explains that, in general, xDSL communication is sensitive in that it uses higher frequencies across twisted pair copper line, thus physical characteristics such as impedance and line length are important to the integrity of the telephone line. Sisk, at col. 4, lines 8-11. The evaluation can assess such things as loss of energy, change in bit stream pattern, and other changes of the test signature. Sisk, at col. 4, lines 15-17. Sisk indicates pass or fail by an audible alarm, a visual display, an electronic message or an electronic signal. Sisk, at col. 4, lines 19-26. In one implementation of Sisk, an electronic flag can be provided to software such that automated loop monitoring can be established at the local loop termination point. Sisk, at col. 4, lines 26-29.

Grimsrud is directed toward a method and apparatus for analyzing interactions between workloads and locality dependent subsystems. Grimsrud, Title. According to Grimsrud, locality dependent subsystems include "cache subsystems, instruction fetch units and the like." Grimsrud, at col. 1, lines 34-35. Grimsrud teaches that a locality characteristic generator generates locality characteristic data for various

workloads based on captured execution trace records of the workloads comprising addresses of accesses made during execution. Grimsrud, at col. 1, lines 59-62. A response surface characteristic generator generates the response characteristic data for various locality dependent subsystems based on independently captured response records comprising target addresses of the stimuli applied and response times to the stimuli. Grimsrud, at col. 1, lines 62-67. According to Grimsrud, the locality characteristic data is determined based on generating reference distances (d) and corresponding stride sizes (s) for each references access. Grimsrud, at col. 4, lines 9-34. Response characteristic data is determined based on generating reference distances (d) and corresponding stride sizes (s) for all applied stimuli. Grimsrud, at col. 4, lines 35-65.

Grimsrud explains that the address sequences for workload accesses and stimulus applications are typically not the same, since representative execution of workloads and stimulating locality dependent subsystems are performed separately and independently. Grimsrud, at col. 5, lines 6-11. Any one of the locality characteristic profiles can be used in conjunction with any one the independent response surface characteristic profiles to analyze the interaction between the particular combination of workload and locality dependent subsystem. Grimsrud, at col. 2, lines 1-5. An exemplary approach to analyzing the interaction is through visual inspection of the response surface characteristic profile for region(s) of (d,s) values whether the locality characteristic profile indicates a high propensity for activities. Grimsrud, at col. 2, lines 5-9. In an alternative embodiment of Grimsrud, the generated locality and response time characteristic data are combined together in a "weighted" manner to generate expected performance indices for various workload and locality dependent subsystem combinations. Grimsrud, at col. 2, lines 10-14 (quotations in original).

As mentioned, the present invention is directed toward an automated system adaptation technique for computer systems, networks and subsystems generally and, more particularly, for data storage systems. According to the applicants' claim 1, a method for adaptation of a computer system, network or subsystem comprises developing a design for the system and performing an automated loop comprising implementing the design; analyzing operation of the design after said implementing; and modifying the design based on results of said analyzing. In contrast, the Sisk reference relates to testing of a telephone subscriber line to determine whether it will

support xDSL communication. Thus, the Sisk reference is not within the field of the applicant's endeavor and is not reasonably pertinent to the particular problem with which the applicants were concerned. See MPEP, Section 2141.01(a), (discussed above are requiring that a 103 reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned). Testing telephone subscriber lines to determine suitability for xDSL service is not within the same field of endeavor, nor is it reasonably pertinent to the applicants' claimed invention. Therefore, Sisk cannot be properly combined with the other references to reject the applicants' claims.

Accordingly, the applicants respectfully submit that the combination of Sisk, Hirosawa and Grimsrud is improper. For at least this reason, claims 1, 13 and 25 are allowable.

Further, the Hirosawa reference is directed toward a method and apparatus for aiding configuration management of a computer system, whereas, the Grimsrud reference is directed toward a method and apparatus for analyzing interactions between workloads and locality dependent subsystems. These fields and problems solved are completely distinct from that of the Sisk reference. Therefore, there could be no motivation to combine the references in the manner suggested by the examiner.

The applicants' respectfully submit that this is another reason why the combination of these references is improper and is, thus, another reason why claims 1, 13 and 25 are allowable.

Further, Hirosawa is concerned with the physical layout and configuration of a computer system, particularly, the locations of equipment, cables between them, cooling the equipment and providing adequate power for the equipment. In contrast, Grimsrud is concerned with the interactions between particular workloads and "locality dependent subsystems." While both references are within the broad field of computer systems, their particular concerns are entirely distinct. Accordingly, there would not have been a suggestion or motivation to combine these references.

The examiner suggested that a person would have been motivated to combine the references based on a Hirosawa's discussion at col. 1, lines 21-42 of jobs needed to be done when installing a new computer system. However, these jobs are particular to the concerns of Hirosawa, namely, determining the physical layout of equipment, determining whether power supplies and cooling are adequate, preparing a manual of how to connect cables of power supplies, preparing a manual of how to

connect signal cables and determining configuration parameters required by the operating system for the system. See Hirosawa at col. 1, lines 21-42. None of these jobs relates to the concerns of Grimsrud of interactions between particular workloads and "locality dependent subsystems." Therefore, this passage of Hirosawa cannot provide a suggestion or motivation to combine the Hirosawa and Grimsrud references. Simularly, this passage of Hirosawa does not relate at all to testing telephone subscriber lines, as in Sisk. Therefore, this passage of Hirosawa cannot provide a suggestion or motivation to combine the Hirosawa and Sisk references. Finally, because this passage of Hirosawa does not address any of the concerns of Grimsrud or Sisk, it cannot provide a suggestion or motivation to combine the Grimsrud and Sisk references.

This is another reason why the Hirosawa, Grimsrud and Sisk references are not properly combinable and is, thus, another reason why claims 1, 13 and 25 are allowable.

Further, assuming for the sake of argument that these references were properly combined, they do not teach or suggest all of the limitations of the rejected claims, taken singly or incombination.

For example, the examiner stated that at col. 4, lines 1-16 Hirosawa teaches analyzing operation of the design after implementing the design. The applicants respectfully disagree. At col. 4, lines 1-16, Hirosawa discusses checking signal cables and power supply cables after determining their installation locations. It is clear that this is a design step which is performed prior to implementing the system because it is performed using the configuration-management aiding apparatus of figure 1 and is performed prior to generating a drawing and manual that describes the installation instructions. See col. 4, lines 10-18.

As another example, the examiner stated that at col. 4, lines 43-58, Hirosawa teaches modifying the design based on results of said analyzing. The applicants respectfully disagree. As explained above, Hirosawa does not teach performing analysis on an implemented design. Accordingly, Hirosawa cannot do anything based on results of such a step. At col. 4, lines 43-58, Hirosawa simply discusses that intellectual work required in the installation of a new computer system or partial modification of an existing computer system can be supported by using an aid computer through interaction between the aid computer and the user.

As another example, the examiner stated that at col. 4, lines 26-29, Sisk teaches performing an automated loop. The applicants respectfully disagree. As used in the applicants' claims 1, 13 and 25, the "loop" refers performing a sequence of steps. This is clear from the applicants' disclosure. See for example, Figure 1, the related discussion in the applicants' disclosure. Further, the applicants' disclosure teaches that the steps can be performed iteratively. See applicants' disclosure at page 39, line 24 to page 40, line 7. In marked contrast, the term "loop" is used by Sisk to refer to a local loop, which is a loop of wires. These two uses of the term "loop" are completely distinct from each other. Accordingly, the use of "loop" by Sisk cannot teach or suggest performing a "loop," as in the applicants' claimed invention.

As yet another example, the examiner stated that in Figure 2 and at col. 3, lines 12-25, Grimsrud teaches that applying a workload characterization to models of components indicates utilization of a component, as in the applicants' claim 25. The applicants disagree. Rather, Figure 2 of Grimsrud illustrates a block diagram of data and software elements. And, at col. 3, lines 12-25 Grimsrud describes functions of these software elements for generating the locality characteristic data and the response surface characteristics, described above. None of these data and software elements teaches or suggests the indication of utilization of a component.

At least these claim elements are missing from the cited references. Thus, contrary to the examiner's assertion, the applicants respectfully submit that the claim limitations are not taught or suggested by the references, taken singly or in combination. Because not all of the limitations of applicants' claims 1, 13 and 25 are taught or suggested, each missing element provides yet another reason why the claims are allowable. See MPEP, Section, 706.02(j) (discussed above as requiring that 103 prior art references teach or suggest all the claim limitations).

Conclusion:

In view of the above, the applicants submit that all of the pending claims are now allowable. Allowance at an early date would be greatly appreciated. Should any outstanding issues remain, the examiner is encouraged to contact the undersigned at (408) 293-9000 so that any such issues can be expeditiously resolved.

Respectfully Submitted,

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